# *Health Consultation*

Technical Document Review:
Interim Final Baseline Human Health Risk Assessment
Oeser Company Superfund Site (a.k.a. Oeser Company)
Bellingham, Whatcom County, Washington

October 24, 2001

**Prepared by**

**The Washington State Department of Health**
**Under a Cooperative Agreement with the**
**Agency for Toxic Substances and Disease Registry**

## Foreword

The Washington State Department of Health (DOH) has prepared this health consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services and is the principal federal public health agency responsible for health issues related to hazardous waste. This health consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of a health consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. Health consultations focus on specific health issues so that DOH can respond quickly to requests from concerned residents or agencies for health information on hazardous substances. DOH evaluates sampling data collected from a hazardous waste site, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

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# Glossary

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| **Agency for Toxic Substances and Disease Registry (ATSDR)** | The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services. |
| **Aquifer** | An underground formation composed of materials such as sand, soil, or gravel that can store and/or supply groundwater to wells and springs. |
| **Carcinogen** | Any substance that can cause or contribute to the production of cancer. |
| **Chronic** | A long period of time. A chronic exposure is one which lasts for a year or longer. |
| **Contaminant** | Any chemical that exists in the environment or living organisms that is not normally found there. |
| **Dose** | A dose is the amount of a substance that gets into the body through ingestion, skin absorption or inhalation. It is calculated per kilogram of body weight per day. |
| **Exposure** | Contact with a chemical by swallowing, by breathing, or by direct contact (such as through the skin or eyes). Exposure may be short-term (acute) or long-term (chronic). |
| **Groundwater** | Water found underground that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater often occurs in quantities where it can be used for drinking water, irrigation, and other purposes. |

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| **Hazardous substance** | Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive. |
| **Indeterminate public health hazard** | Sites for which no conclusions about public health hazard can be made because data are lacking. |
| **Inorganic** | Compounds composed of mineral materials, including elemental salts and metals such as iron, aluminum, mercury, and zinc. |
| **Media** | Soil, water, air, plants, animals, or any other part of the environment that can contain contaminants. |
| **Model Toxics Control Act (MTCA)** | The hazardous waste cleanup law for Washington State. |
| **Monitoring wells** | Special wells drilled at locations on or off a hazardous waste site so water can be sampled at selected depths and studied to determine the movement of groundwater and the amount, distribution, and type of contaminant. |
| **Organic** | Compounds composed of carbon, including materials such as solvents, oils, and pesticides which are not easily dissolved in water. |
| **Remedial investigation** | A study designed to collect the data necessary to determine the nature and extent of contamination at a site. |
| **Route of exposure** | The way in which a person my contact a chemical substance that includes ingestion, skin contact and breathing. |

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| **U.S. Environmental Protection Agency (EPA)** | Established in 1970 to bring together parts of various government agencies involved with the control of pollution. |
| **Volatile organic compound (VOC)** | An organic (carbon-containing) compound that evaporates (volatilizes) easily at room temperature. A significant number of the VOCs are commonly used as solvents. |

## Background and Statement of Issues

The Washington State Department of Health (DOH) has conducted this health consultation in response to a request from the U.S. Environmental Protection Agency (EPA) to review and provide comments on their June 2001, Interim Final Baseline Human Health Risk Assessment (HHRA) for the Oeser Company Superfund site. This report, prepared in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), summarizes DOH's response to the HHRA. As requested by EPA, DOH comments were restricted to substantive issues that could affect the characterization of risk or could impact the subsequent evaluation of cleanup alternatives during the feasibility study.[1]

The Oeser Company is an active wood treating facility located at 730 Marine Drive in Whatcom County, Washington. The facility, which began operation in 1943, occupies approximately 26-acres in a mixed industrial and residential area. The northeastern portion of the facility lies within the City of Bellingham. The facility currently treats utility poles and pilings with a pentachlorophenol (PCP) solution. Creosote was used to treat wood at the site in the past. Some of the wood treating preservatives have been released into the environment through spills, leaks, and waste disposal activities at the site. Pentachlorophenol (PCP); polycyclic aromatic hydrocarbons (PAHs), the predominant chemicals found in creosote; dioxin, a contaminant associated with PCP; and other organic compounds have been identified in soil, groundwater, surface water, sediment, and air on and off of the Oeser facility.[2] The site was placed on EPA's National Priority List (NPL) in October 1997 because of its potential threat to human health and the environment.

DOH has been evaluating the effects of the site on human health since 1995 when it was being considered by EPA for possible inclusion on the NPL. DOH completed a number of health consultations in the mid-to-late1990s using available environmental data to assess potential health effects posed by the site. A public health assessment, which was released to the public for review in February 1999, was conducted in response to the NPL listing.

The 1999 public health assessment report will be significantly modified by DOH in the near future. DOH will conduct a detailed analysis of the environmental data collected by EPA over the last few years and determine whether the levels of contaminants found in the various environmental media (soil, water, sediment, and air) on and off of the Oeser facility pose a threat to human health. Past, current, and potential future exposures will be evaluated. The results of DOH's analysis will be presented in a revised public health assessment document that will be available later this year for public review.

DOH has worked with various federal, state, and local agencies and the community to address health concerns since it became involved with the Oeser site in the mid-1990s. This health consultation and future documents are part of an on-going effort by DOH to respond to those concerns.

## Discussion

The primary purpose of EPA's HHRA, a component of the preliminary site characterization being conducted at the Oeser site, is to evaluate the potential current and future adverse health effects associated with contaminants found at the site in the absence of remedial actions. The results of the HHRA will be used to support decisions about the necessity for site cleanup as well as aid in decisions about the extent of cleanup activities and selection of cleanup technologies.[3]

A significant amount of data were collected and evaluated by EPA during site characterization activities to determine the nature and extent of contamination at the Oeser site. EPA's findings are summarized in its Technical Approach for Risk Assessment (TARA) tables and Interim Final Preliminary Site Characterization Summary Report (Site Characterization), July 2001. The TARA tables were provided to DOH along with the HHRA. The site characterization report, which contains significant information about the contamination discovered at the site, was received by DOH a few week after receiving the HHRA. Although the site characterization report contains significant information and data about the nature and extent of contamination, there is often inadequate information included in the document to support EPA's rationale for sampling and analytical decisions or it findings about the site. References were provided in the site characterization report indicating where some of the supporting rationale could be found. However, the time required to provide comments on the HHRA does not allow for such extensive document review. As a result, DOH's comments on the HHRA are limited.

DOH will be conducting a detailed analysis of site data and review of some of the historical documents including the scoping report, work plan, and sampling and analysis plan as part of its on-going public health assessment. Any substantive issues or concerns about the HHRA, beyond those identified in this health consultation, will be provided to EPA as DOH becomes aware of them. These issues and concerns, if identified, will also be summarized in the revised public health assessment report.

The following comments summarize DOH's current issues and concerns regarding the HHRA:

1. *Section 2.1, Contaminant of Potential Concern Selection* - EPA risk assessment guidance was reportedly used as the basis for selecting contaminants of potential concern (COPC) during the Oeser HHRA.[3] However, it is not clear that the guidance was followed when eliminating individual chemicals from further consideration. The Model Toxics Control Act (MTCA) Cleanup Regulation (Chapter 173-340 WAC), an applicable, relevant and appropriate requirement (ARAR) provides factors to be evaluated before eliminating individual hazardous substances from further consideration but these factors were not mentioned in the HHRA.[4] EPA should provide supporting information in the HHRA to show that they considered all the required factors before eliminating chemicals from further consideration.

2. *Section 2.1.1 Initial Data Review and Analysis* - The HHRA indicates that tentatively identified compounds (TICs) were excluded from consideration as COPCs but that they may have been evaluated as part classes of compounds, such as petroleum hydrocarbons. No other information was provided about the TIC evaluation process in the HHRA. A brief discussion in the site characterization report indicates that TICs were not evaluated during the analysis of the site characterization data because there is a reduced level of quality assurance associated with TIC data and the concentration results are estimated. Neither approach for evaluating TICs appears consistent with EPA's risk assessment data evaluation guidance which indicates that the TIC data should be evaluated to determine if the chemicals pose a potential threat to human health before determining whether they should be eliminated from the risk assessment process.[5] DOH recommends that EPA follow its guidance regarding TICs.

3. *Section 2.1.2 Evaluation of Chemical Concentrations* - According to the HHRA, all analytes detected in any environmental medium were included in a risk based screening process to identify COPCs at the Oeser site.[3] The risk based screening process, however, should also have considered those chemicals where no detection occurred if the chemical is considered a potential site contaminant. At a minimum, half of the practical quantitation limit (PQL) should have been assigned to these chemicals. This approach is consistent with EPA's Superfund risk assessment guidance which indicates unless site specific information indicates that a chemical is not likely to be present in a sample, a zero value should not be used in of place of the sample quantitation limit or half of the sample quantitation limit. The guidance also indicates that the non-detected results should not be omitted from the risk assessment.[4] Consistent with its guidance, EPA should evaluate all non-detected compounds including those used in the complex chemical mixture determinations (e.g., petroleum hydrocarbons, benzo(a)pyrene equivalents, and the 2,3,7,8- tetrachlorodibenzo-p-dioxin (2,3,7,8 TCDD)) to ensure that no chemicals have been inappropriately eliminated as COPC. EPA should modify the COPC list, as appropriate.

4. *Section 2.1.2 Evaluation of Chemical Concentrations* - DOH concurs with the use of MTCA cleanup levels for petroleum and EPA Region 9 Preliminary Remediation Goals for all other chemicals as site specific screening levels as long as these levels represent the most human health protective levels applicable to this site.

5. *Section 2.1.2 Evaluation of Chemical Concentrations* - Use of the data in the Exposure Factor Handbook (EFH) , Table 9-13, are appropriate for estimating the risk associated with the consumption of blackberries at the site. The EFH, however, indicates that use of these data in calculating potential doses does not require the body weight factor in the denominator of the average daily dose equation and states that the conversion of these intake rates into units of g/day by multiplying by a single average body weight is not appropriate because the database did not rely on a single body weight for all individuals.[6] Risk based chemical concentrations for blackberries exposure pathway should be

recalculated since intake rates were multiplied by an average body weight and the data reassessed to verify that no potential human health threat exists.

6. *Section 2.1.3 Evaluation of Background* - Inorganic chemicals were not evaluated in the baseline HHRA because site results were reportedly not significantly different than those from background samples suggesting that inorganic chemicals are not associated with the facility operation. DOH cannot verify this conclusion because no inorganic data result summaries are provided in the HHRA or the Site Characterization report.

7. *Section 2.2.2 Contaminant of Potential Concern Screening Procedure* - A number of chemicals where the detection limits exceed screening levels are presented in Table 2-4. The HHRA indicates that most of these compounds were detected and evaluated for the various media. However, this does not appear to be the case. For example, 14 compounds were detected above screening levels in air and retained as COPCs. The number of compounds that were not detected in air samples but exceeded the screening level is 32. DOH recommends that site related chemicals be retained as COPC if half of a PQL exceeds the chemical specific screening level.

8. *Section 3.1.1 Human Health Conceptual Site Model* - According to TARA Table 1, no quantitative exposure assessment was conducted for those receptors who had less potential for exposure to an environmental medium than would other receptors. For example, the on-site recreational/visitor exposure scenario for surface soil was not evaluated because exposures are reportedly minimal compared to the on-site worker. Although some exposures may be minimal, DOH disagrees that these exposure should not be quantified. All potential exposure scenarios should be evaluated to determine potential risks to human health posed by the site.

9. *Section 3.2 Exposure Pathways* - Since sediments are not inundated throughout the year, they should be evaluated to determine whether incidental ingestion is a significant route of exposure.

   Currently, only Tilbury Cement Company appears to be using the deep aquifer near the site for drinking water and industrial use. Potential future residential and industrial use of the deep aquifer is anticipated. Given these current and potential future groundwater uses, residents and workers could be exposed to contaminants in the deep aquifer through ingestion, inhalation, and dermal contact routes of exposure. The three routes of exposure were evaluated in the HHRA for the residential receptor. However, only the ingestion route of exposure was evaluated for a worker receptors. The inhalation and dermal routes of exposure for workers should also be included in the conceptual model.

10. *Section 3.2 Exposure Pathways* - Off facility workers including utility and construction workers can potentially be exposed to contaminants beyond the Oeser facility boundaries.

Their potential exposure to contaminants from the site should be evaluated as part of the HHRA.

11. *Section 3.3.1.2 On-facility Surface and Subsurface Soil (Future Exposure Scenarios)* - Three exposure point concentrations (EPCs) were calculated for three subsurface soil intervals: 0-6 feet below ground surface ( bgs), 6-12 feet bgs, and 12-18 feet bgs. However, it is unlikely that a person would only be exposed to one of the deeper intervals without also being exposed to the upper intervals. DOH recommends that Ecology's Toxics Cleanup Program data analysis guidance be used when calculating exposure point concentration for subsurface soil.[7]

12. *Section 3.3.1.5 On- and Off-Facility Groundwater (Current and Future Exposure Scenarios)* - The rationale for not including half of the PQL when quantifying exposure point concentrations for groundwater is not appropriate if the chemicals are potentially associated with the site. The data should be re-evaluated accordingly.

13. *Section 3.3.1.6 Off-Facility Air (Current and Future Exposure Scenarios)* - EPCs for off facility air were calculated using the arithmetic average for all quarterly air samples from each location. The rationale for this approach, however, was not provided in the HHRA report. DOH cannot comment on this approach without further information.

14. *Section 3.3.2 Exposure Factors* - The adult and child surface area exposure factors for dermal contact with contaminated soil used in the HHRA are underestimated according to the EPA Exposure Factor Handbook (EPH). For a residential adult exposure, EFH recommends a central tendency value of 5000 $cm^2$ and a upper percentile value of 5800 $cm^2$.[6] EPA RCRA guidance provides similar numbers for adults: central tendency value of 5700 $cm^2$ and upper bound value of 6600 $cm^2$. EPA RCRA guidance for skin surface area for a child is a central tendency value of 2900 $cm^2$ and 3400 $cm^2$ upper bound value.[8] The child and adult surface area exposure factor used in the HHRA for dermal contact with contaminated groundwater are also underestimated based on EPH which indicates central tendency values of 6640 $cm^2$ and 20,000 $cm^2$ for child and adult exposures, respectively.[6] Daily doses should be recalculated based on appropriate surface area exposure values.

15. *Section 3.3.2.1 Residential Scenario and Section 3.3.2.3 Recreational Scenario* - Adult and child residents and recreational users are potentially exposed to fugitive dust associated with the Oeser site through the inhalation route of exposure based on the conceptual site model. However, this exposure pathway is not addressed for these receptors in the HHRA. The HHRA should be revised to include an evaluation of these exposure pathways.

16. *Section 3.3.2.2 Industrial Scenario* - Since deep groundwater is currently used for drinking water and industrial uses and potential future use is expected to be similar, the

inhalation and dermal contact routes of exposure for groundwater should be evaluated in the HHRA.

17. *Section 3.4.1 Environmental Sampling* - Shallow groundwater monitoring wells were sampled using a peristaltic pump.[2] Peristaltic pumps are not appropriate devices for collecting groundwater samples for volatile organic analysis because the volatile compounds can be lost during sampling.[9] As a result, exposure point concentrations for volatile organic compounds (VOCs) and volatile petroleum hydrocarbons (VPH) are likely underestimated. Peristaltic pumps can also result in low levels of organic compounds such as phthalates leaching into groundwater samples because the flexible tubing used to operate the pump are in contact with the groundwater sample. Exposure point concentrations for some semi-volatile organic compounds may be overestimated.

    The deep monitoring wells were sampled with dedicated submersible pumps. Submersible pumps are water cooled and can effect sample temperature and volatile organic chemical concentrations if run at too low of a flow rate. It is uncertain whether the use of these pumps affected the sampling results. Temperature ranges at each well for each sampling event should be evaluated to determine whether a significant groundwater sample temperature change occurred from the beginning of the well purging to the collection of the VOC and VPH samples to determine whether exposure point concentrations are over- or underestimated.

18. *Section 5.2.3 Petroleum Hydrocarbon Non-Carcinogenic Hazard Quotients* - The HHRA indicates that adding individual benzene, toluene, ethylbenzene, and xylene (BTEX) compound hazard quotients (HQs) to the HQ derived for petroleum would result in double counting. However, this is not accurate. Ecology guidance on calculating soil and groundwater cleanup levels for petroleum compounds provides a means to prevent double count of petroleum contaminants such as ethylbenzene and xylenes.[10] The HQs for petroleum compounds such as ethylbenzene and xylenes, other petroleum compounds, and non-petroleum compounds should be added to obtain a hazard index.

19. *Section 5.3 Risk Estimates* - No information about overall risk across environmental media is included in the HHRA. This information is important for assessing the level of risk that this site poses to the various receptors at the site and should be included in the HHRA.

20. *Section 5.3.11 Potential Lifetime Cancer Risk Associated with Groundwater and Section 5.3.12 Potential Non-carcinogenic Effects Associated with Groundwater* - Increased leaching and migration of groundwater contaminants would likely occur if impermeable caps and structures are removed from the site in the future. As a result, risk estimates for future exposures to groundwater in the deep aquifer are likely underestimated. This should be addressed in the HHRA.

21. *Section 5.3.11.2 Future Exposure Scenarios, On-Facility Resident* - EPA's Superfund risk assessment guidance indicates that a zero value should be used if a chemical is not detected and unlikely to be present in a sample. It is not clear whether the 2,3,7,8 TCDD TEQ risk associated with the background well in the deep groundwater aquifer (MW-06) is a result of the use of half practical quantitation limits or actual detected concentrations of dioxins and furans. This information should be added to HHRA. The background risk estimates for other COPCs detected in groundwater should also be provided in the HHRA.

22. *Section 7 Recommendations* - The deep aquifer is a current and potential future drinking water source. Institutional controls or remedial actions should be developed at the site to prevent increased leaching and/or migration of contaminants to the aquifer.

    Other recommendations may be necessary after EPA evaluates the total risk posed by the site.

## Child Health Initiative

The Oeser Company Superfund site is located in an area where children potentially could be exposed to contaminants through the soil, water, sediment, and air pathways. Children can be uniquely vulnerable to the hazardous effects of environmental contaminants. When compared to adults, pound for pound of body weight, children drink more water, eat more food, and breathe more air. Children have a tendency to play closer to the ground and often put their fingers in their mouths. These facts lead to an increased exposure to contaminants in various environmental media. Additionally, the fetus is highly sensitive to many chemicals, particularly with respect to potential impacts on childhood development. For these reasons, it is very important to consider the specific impacts that contaminants may have on children, as well as other sensitive populations.

## Conclusions

The Oeser Company Superfund site poses an indeterminate health risk because further characterization of site related exposures is necessary.

## Recommendations/Action Plan

1. DOH's comments and recommendations should be incorporated into the revised baseline HHRA.

2. Future, draft and final plans and reports prepared for Oeser site should be provided to DOH for review.

## Preparer of Report

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# References


1. Memo Oeser Company Interim Final Baseline Human Health Risk Assessment, July 2001, Bill Adams, Environmental Protection Agency.

2. The Oeser Company Superfund Site, Interim Final Preliminary Site Characterization Summary Report, Bellingham, Washington, TDD: 01-03-0016, Region 10 START-2, July 2001.

3. The Oeser Company Superfund Site, Interim Final Human Health Risk Assessment, Bellingham, Washington, TDD: 01-03-0016, Region 10 START-2, June 2001.

4. Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, Washington State Department of Ecology, Amended February 12, 2001.

5. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A, Interim Final, U.S. Environmental Protection Agency, December 1989.

6. Exposure Factors Handbook, U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, August 1997.

7. Guidance on Sampling and Data Analysis, Washington State Department of Ecology, Toxics Cleanup Program, January 1995.

8. Interim Final Guidance: Developing Risk-Based Cleanup Levels at Resource Conservation and Recovery Act Sites in Region 10, Tetra Tech EM-prepared for EPA's Office of Waste and Chemicals Management, Seattle, Washington, January 5, 1998.

9. RCRA Ground-Water Monitoring: Draft Technical Guidance, U.S. Environmental Protection Agency, Office of Solid Waste, November 1992.

10. Workbook Tools for Calculating Soil and Ground Water Cleanup Levels under the Model Toxics Control Act Cleanup Regulation, User's Guide, Washington State Department of Ecology, Toxics Cleanup Program, August 2001.

## Certification

This Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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